



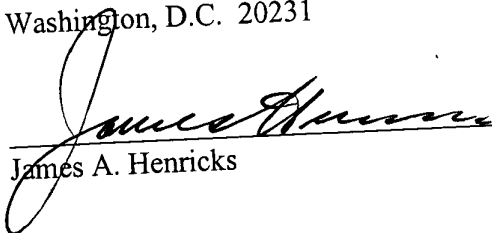
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James A. Henricks

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application Of: **RICHARD J. RICHARDSON**  
Serial Number: 08/919,947  
Filed: August 29, 1997  
Title: LIGHTING CIRCUIT, LIGHTING SYSTEM METHOD AND APPARATUS, SOCKET ASSEMBLY, LAMP INSULATOR ASSEMBLY AND COMPONENTS THEREOF

Examiner: **Ward, J.**

Group Art Unit: 2875

Assistant Commissioner For Patents  
Washington, D.C. 20231

RESPONSE TO OFFICE ACTION DATED SEPTEMBER 15, 1999

Sir:

In response to the Office Action dated September 15, 1999, and identified as paper No. 10, please reconsider the claims in the above-identified application in view of the following remarks.

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**REMARKS**

Claims 1-99 are pending in the application, and claims 1-80 are withdrawn from consideration, and were cancelled in the Response to the Restriction Requirement. Claims 81-99 are rejected. No claims other claims have been canceled and no new claims have been added at this time.

Applicant acknowledges the Notice of References Cited, and the Information Disclosure Statements, paper Nos. 4, 5 and 7. Applicant notes that a further Information Disclosure Statement was filed on or about June 26, 1999, a copy of which is enclosed with a copy of the Form-1449 and return postcard. Applicant respectfully requests acknowledgement that these references have been considered and made of record. If this additional paper did not reach the file, Applicant will re-submit the information.

Applicant appreciates the indication that the informal drawings are acceptable for examination purposes. Formal drawings will be filed when the application is allowed.

Claims 81 and 89-91 are rejected under 35 U.S.C. 102 (b) as being allegedly anticipated by *Amstutz et al.*, U.S. patent No. 4,955,044. Claims 82-88 and 92-99 are rejected under 35 U.S.C. 103 (a) as being allegedly unpatentable over *Amstutz et al.* in view of *Kelman*, U.S. Pat No. 2,522,044 and further in view of *Seok et al.*, U.S. Pat No. 5,768,898. Applicant respectfully requests reconsideration of the rejections in view of the following remarks.

Consider first Applicant's disclosure. Applicant discloses a lighting system for a refrigerated display case which improves the operating characteristics of the lighting system. For example, the operating temperature of the ballast and/or associated components can be reduced, and the occurrence of such problems as ballast failure, lamp failure and component failure can be reduced in many instances as well. The lighting system can also provide a better matched lighting circuit less likely to lead to circuit breakdown or failure even at higher voltages provided by some ballasts. [See, Applicant's Specification, p. 9, lines 17-24.]

In many conventional lighting systems used in refrigerated display cases, fluorescent lamps are used to illuminate product in the display cases. The lamps are driven by current

developed and controlled by an electronic ballast, which can often produce upwards of 400 and 500 volts or more in open circuit voltage at anywhere between 30,000 and 80,000 kHz. Electronic ballasts are used for their relatively small size and the relatively high voltages that can be produced to operate fluorescent lamps at lower than room temperature. These ballasts can often properly drive fluorescent lamps even in sub-freezing temperatures. However, it is typically more difficult to drive fluorescent lamps at sub-ambient temperatures because of the higher voltages required to keep the lamp lit without flickering, strobing or dimming. Other ballasts, such as magnetic or electro-magnetic ballasts, can also be used in regular display cases, but magnetic ballasts are relatively larger in size and more difficult to conveniently position in a display case. Electro-magnetic ballasts are also not as desirable in some respects as electronic ballasts, for example because of their size or operating characteristics.

Because of the conditions in refrigerated display cases in which ballasts are used to drive fluorescent lamps, the lighting circuits are susceptible to problems. These problems may include ballast failure, component failure, and the like, which sometimes can lead to loss of equipment and even destruction of the display case. The high voltages experienced in these lighting systems may lead to arcing between components, a phenomenon that has been observed, especially where there is inadequate or incomplete contact between components. Components have melted or failed entirely. It is also believed that inadequate contact between components is reflected back into and affects the ballast operation, and may lead to over heating and possibly failure of the ballast.

One aspect of the present inventions is directed to the electrical circuit including the ballast and a lamp socket. For example, the ballast may be mounted adjacent a frame in the refrigerated display case for operating at a frequency above 100 Hz and above 200 volts. The socket preferably includes contacts having a surface area available for electrical contact of at least 0.008 square inch. A junction allows wiring to releasably couple the ballast to the socket, and the junction also preferably has a surface area available for electrical contact of at least 0.008 square inch. In one preferred embodiment, the junction includes at least one pin connector and at

least one mating hollow cylindrical connector enclosed in a plastic housing.

In a further aspect of one of the present inventions, the wiring connecting the ballast and the socket has a size no smaller than 16 gauge. The larger than conventional wiring size helps to insure a lower conductor resistance, so as to help minimize the overall circuit resistance as seen by the ballast. Consequently, the ballast may possibly see a somewhat smaller load during normal operation.

In a further aspect of one of the present inventions, the lamp socket preferably includes a surface area for contacting a contact on the fluorescent lamp of least 0.01 square inch, and in another embodiment at least 0.05 square inch or more. Higher surface areas of contact reduce the overall circuit resistance as seen by the ballast, and reduce the possibility of arcing between components during normal operation.

Consider now the references relied upon by the Examiner. *Amstutz* shows a lighted display case having a lighting system including a ballast 44 and a socket and plug combination 107 and 105, respectively. Nothing in *Amstutz* teaches or suggests any refrigerated display case which has a ballast which can drive a lamp at anything below sub-ambient temperatures, that operates above 100 Hz or above 200 volts or that has any components with surface areas of contact that are anything other than conventional. Nothing in *Amstutz* teaches or suggests structures or functions that improve the ability of a ballast to reliably drive a lamp in cold conditions without excessively over heating the ballast or producing arcing between components.

*Kelman* shows a fluorescent light socket of the tombstone style having arcuate contact surfaces for contacting pins on a fluorescent lamp. Nothing in *Kelman* over comes the deficiencies of *Amstutz*. Additionally, the Australian reference of Orford shows a socket that may have cylindrical contact surfaces for contacting pins on a fluorescent lamp.

*Seok* shows a refrigerator having a fluorescent lamp with a lamp cover 15 separating the lamp from the cold compartment. Applicant has been unable to determine from the reference where the ballast 33 is located. However, it is noted that an auxiliary heater 28 is used to improve the operation of the lighting system. Nothing in *Seok* teaches or suggests Applicant's

improvements.

Consider now the claims in Applicant's application. Claim one is an independent apparatus claim reciting in part:

"an electronic ballast mounted adjacent the frame for operating at a frequency above 100 cycles per second and above 200 volts;

...;

a junction between the at least one electrical conductor and the contacts of the at least one lamp socket for forming an electrical bridge between the at least one electrical conductor and the contacts wherein the bridge has a surface area available for electrical contact of at least 0.008 square inch."

None of the cited references teach or suggest operating a ballast at the recited levels with a junction as recited. *Amstutz* appears to be related to a display case operating with a conventional ambient-temperature lighting system, and there is no reference as to how the ballast operates or to the electrical circuit beyond how the electrical circuit is positioned and installed. None of the other references solve the deficiencies of *Amstutz*. Clearly claim one is patentable over *Amstutz* as well as over the other references of record.

Claims 82-99 are dependent directly or indirectly from independent claim 81 and are asserted as being patentable for the same reasons that were discussed with respect to claim 81 and for the additional limitations set forth in the dependent claims. None of the references teach or suggest the combinations of these dependent claims. Note for example claim 85 reciting in part "wherein the at least one electrical conductor includes wire having a size no smaller than 16 gauge . . . ." Note also claim 90 reciting in part "wherein the junction includes at least one pin connector and at least one mating hollow cylindrical connector and wherein the connectors are enclosed in a plastic housing." Claim 94 recites in part "wherein the at least one socket contact for the fluorescent lamp includes a surface area for contacting a contact on the fluorescent lamp having at least 0.01 square inch surface area available for electrical contact with the contact on the fluorescent lamp." Claim 97 recites in part "wherein the junction includes pin conductors

engaging hollow cylindrical mating conductors surrounded by plastic." None of the combinations of the dependent claims are taught or suggested by the prior art, taken singly or in combination.

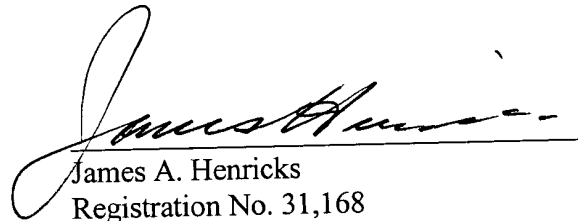
Reconsideration of the claims in view of the foregoing remarks is respectfully requested. Early notice of allowance of the claims herein is earnestly solicited. If there are any issues requiring further discussion, Applicant invites the Examiner to call the undersigned attorney.

This Response is being filed with a petition for a three-month extension of time.

The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, relating to this communication to Account No. 50-0655. A duplicate of this sheet is enclosed.

Respectfully submitted,

Dated: March 15, 2000



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